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Claims

[c1] A network system providing integration, comprising:
a client computer;
a server;
a server-side cryptographic function providing cryptographic services located on the server;
a PKI-Bridge providing an interface between the server and the server-side cryptographic function;
a remote access switch providing an interface between the client computer and the server;
a client-side cryptographic function providing cryptographic services located on the client computer;
a dial-up client providing dialing services to access the remote access switch; and
a custom script dynamically linked library providing an interface between the dial-up client and the client-side cryptographic function.

Claim2 –

[c2] (Amended) The network system of claim 1, further comprising:
a security device holding authentication information; and
a security device [card] reader attached to the client computer for reading the security device.

Claims 3-13

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- [c3] The network system of claim 2, wherein a certificate is stored on the security device.
- [c4] The network system of claim 2, wherein the security device is a smart card.
- [c5] The network system of claim 1, further comprising:
a directory service accessed by the server-side cryptographic function.
- [c6] The network system of claim 5, wherein the directory service is lightweight directory access protocol compliant.
- [c7] The network system of claim 1, wherein the client-side cryptographic function and the server-side cryptographic function employ the same cryptographic scheme.
- [c8] The network system of claim 1, wherein the server-side cryptographic function uses a random number generator to generate a challenge string.
- [c9] The network system of claim 1, wherein a client-side cryptographic function uses a random number generator to generate a response string.
- [c10] The network system of claim 1, wherein the client-side cryptographic function generates a signed response string.
- [c11] The network system of claim 1, wherein the server-side cryptographic function generates a challenge string.
- [c12] The network system of claim 1, wherein the server-side cryptographic function verifies the signed response string.
- [c13] The network system of claim 1, wherein the dial-up client operates in terminal mode.

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Claim 14

[c14] (Amended) A network system providing integration, comprising:

- a client computer;

- a server;

- a server-side cryptographic function providing cryptographic services located on the server;

- a PKI-Bridge providing an interface between the server and the server-side cryptographic function;

- a remote access switch providing an interface between the client computer and the server;

- a client-side cryptographic function providing cryptographic services located on the client computer;

- a dial-up client providing dialing services to access the remote access switch;

- a custom script dynamically linked library providing an interface between the dial-up client and the client-side cryptographic function;

- a security device holding authentication information;

- a security device [card] reader attached to the client computer for reading the security device; and

- a directory service accessed by the server-side cryptographic function.

Claim 15

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[c15] A client computer comprising:

- a dial-up client providing dialing services to the client computer;
- a client-side cryptographic function providing cryptographic services located on the client computer; and
- a custom script dynamically linked library providing an interface between the dial-up client and the client-side cryptographic function.

Claim 16

[c16] (Amended) The client computer of claim 15, further comprising:

- a security device [card] reader attached to the client computer for reading a security device.

Claim 17

[c17] The client computer of claim 15, wherein a security device is a smart card.

Claim 18

[c18] (Amended) The client computer of claim 15, wherein the custom script dynamically linked library [dial-up client] comprises a SDLogin component and a SDSetupDial component.

Claim 19

[c19] The client computer of claim 15, wherein the dial-up client automates the authentication process using a hidden terminal operating in terminal mode.

Claim 20

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[c20] (Amended) A client computer comprising:

- a dial-up client providing dialing services to the client computer;
- a client-side cryptographic function providing cryptographic services located on the client computer;

- a custom script dynamically linked library providing an interface between the dial-up client and the client-side cryptographic function; and
- a security device [card] reader attached to the client computer for reading a security device.

Claim 21-23

[c21] A server comprising:

- a server-side cryptographic function providing cryptographic services located on the server; and
- a PKI-Bridge providing an interface between the server and the server-side cryptographic function.

[c22] The server of claim 21, further comprising:

- a directory service accessed by the server-side cryptographic function.

[c23] A server comprising:

- a server-side cryptographic function providing cryptographic services located on the server;
- a PKI-Bridge providing an interface between the server and the server-side cryptographic function; and
- a directory service accessed by the server-side cryptographic function.

Claim 24-25

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[c24] (Amended) A method of integrating via a dial-up interface, comprising:

- sending session initiation information from a dial-up client to a PKI-Bridge;
- checking session initiation information by the PKI-Bridge;
- generating a challenge string by a server-side cryptographic function;
- forwarding the challenge string to a custom script dynamically linked library;
- forwarding the challenge string to a client-side cryptographic function from the custom script dynamically linked library;
- utilizing [retrieving] a private key from a security device;
- generating a response string;
- signing the response string with the private key of a dial-in user;
- forwarding a signed response string to the custom script dynamically linked library;
- dividing the signed response string into packets;
- forwarding packets to the PKI-Bridge;
- reconstructing the signed response string from packets;
- forwarding a reconstructed signed response string to the server-side cryptographic function;
- obtaining a public key of the dial-in user; and
- verifying the reconstructed signed response string using the server-side cryptographic function.

[c25] (Amended) The method of claim 24, further comprising:

- reading the security device by a security device [card] reader.

Claim 26-33

- [c26] The method of claim 24, further comprising:
encoding the signed response string.
- [c27] The method of claim 24, further comprising:
decoding the signed response string.
- [c28] The method of claim 24, further comprising:
forwarding the challenge string to the dial-up client; and
forwarding the challenge string to the PKI-Bridge.
- [c29] The method of claim 24, further comprising:
forwarding packets from the custom script dynamically linked library.
- [c30] The method of claim 24, wherein the security device is a smart card.
- [c31] The method of claim 24, wherein the session initiation information comprises
version information and a distinguished name.
- [c32] The method of claim 24, wherein the public key is stored on a directory service.
- [c33] The method of claim 32, wherein the directory service is lightweight directory
access protocol compliant.

Claim 34-35

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[c34] (Amended) A method of integrating via a dial-up interface, comprising:

- sending session initiation information from a dial-up client to a PKI-Bridge;
- checking session initiation information by the PKI-Bridge;
- generating a challenge string by a server-side cryptographic function;
- forwarding the challenge string to a custom script dynamically linked library;
- forwarding the challenge string to a client-side cryptographic function from the custom script dynamically linked library;
- ~~utilizing~~ [retrieving] a private key from a security device;
- generating a response string;
- signing the response string with the private key of a dial-in user;
- forwarding a signed response string to the custom script dynamically linked library;
- dividing the signed response string into packets;
- forwarding packets to the PKI-Bridge;
- reconstructing the signed response string from packets;
- forwarding a reconstructed signed response string to the server-side cryptographic function;
- obtaining a public key of the dial-in user;
- verifying the reconstructed signed response string using the server-side cryptographic function;
- reading the security device by a security device [card] reader;
- encoding the signed response string;
- decoding the signed response string;
- forwarding the challenge string to the dial-up client;
- forwarding the challenge string to the PKI-Bridge; and
- forwarding packets from the custom script dynamically linked library.

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[c35] (Amended) An apparatus of integrating via a dial-up interface, comprising:

means for sending session initiation information from a dial-up client to a PKI-Bridge;

means for checking session initiation information by the PKI-Bridge;

means for generating a challenge string by a server-side cryptographic function;

means for forwarding the challenge string to a custom script dynamically linked library;

means for forwarding the challenge string to a client-side cryptographic function from the custom script dynamically linked library;

means for utilizing [retrieving] a private key from a security device;

means for generating a response string;

means for signing the response string with the private key of a dial-in user;

means for forwarding a signed response string to the custom script dynamically linked library;

means for dividing the signed response string into packets;

means for forwarding packets to the PKI-Bridge;

means for reconstructing the signed response string from packets;

means for forwarding a reconstructed signed response string to the server-side cryptographic function;

means for obtaining a public key of the dial-in user; and

means for verifying the reconstructed signed response string using the server-side cryptographic function.